

## **ABSTRACT**

**Effect of ultrasonic instrumentation on the retentive strength of zirconia crowns luted with glass ionomer and adhesive resin cements with & without air abrasion- An invitro study**

### **Introduction:**

Great technical advancement in ultrasonic apparatuses over the last few years has permitted their increased use and dissemination among professionals of various specialties. This technological evolution was possible because of the piezoelectric properties of some crystals or metals. Accidental debonding of cemented crowns have been reported with the use of ultrasound. This occurs because in patients with fixed crowns the active tip of the ultrasound apparatus may come in contact with the border of the crown , altering the bond strength of the cement

### **Aim & objective:**

The aim of this study is to analyse the retentive strength of zirconia crowns cemented with glass ionomer and adhesive resin cements subjected to air abrasion and ultrasonic instrumentation for various periods of time

### **Justification for study:**

This study may decipher how much precaution should be taken while doing ultrasonic scaling on the cemented ceramic crowns and also as a way to analyse ultrasonic debonding of cemented crowns

**Methodology:**

**No of samples:** 60 samples

Sixty recently extracted intact human maxillary & mandibular molar teeth was selected. Teeth preparation were standardized by giving 12° taper. Ceramic copings were manufactured using CAD/CAM. The sixty teeth was divided into two groups of 30 each (n=30). Each group was subdivided into two groups of 15 each(n=15). Each subdivided group was subgrouped into three subgroups of 5 each(n=5). After this procedure thirty Copings (n=30) were sandblasted using alumina 100µm. Cementation with GIC & self adhesive resin was performed according to the manufactures instructions. After this procedure, the specimens were submitted to ultrasonic instrumentation for different periods of time 0minute, 3minutes and 5 minutes. Retentive strength tests was performed with an Instron universal testing machine. Statistical analysis was performed using Post-hoc Tukey HSD analysis.

**Statistical analysis:**

The data was subjected to statistical analysis by Multiple Comparison of mean and standard deviation of retentive strength of two cements used for the luting of zirconia copings to natural teeth within Groups A, B after various intervals of ultrasonic vibration using Anova followed by Post-hoc Tukey HSD analysis

**Result:**

The comparison of these values using post hoc tukey analysis shows that there is a statistically significant difference in the tensile bond strength among these six groups. It can be clearly inferred that air abraded zirconia copings luted with dual cure self adhesive resin cement subjected to ultrasonic vibration for a period of 0 min ( Group C1) and vibration for a

period of 3 minutes (Group C2) almost exhibit the same highest tensile bond strength. Zirconia copings without air abrasion luted using Glass ionomer cement subjected to ultrasonic vibration for a period of 5 minutes exhibit lowest tensile bond strength. (group B3).

**Conclusion:**

The tensile bond strength of air abraded zirconia copings luted using dual cure self adhesive resin cement shows highest bond strength than other groups. It can be recommended that dual cure self adhesive resin cement can be used for the cementation of zirconia crowns subjected to air abrasion in clinical situations in order to achieve a more durable bond with the tooth structure and also debonding of crowns from the prepared tooth while conventional oral prophylaxis procedure by ultrasonic scaling can be minimized by using dual cure resin luting cement.